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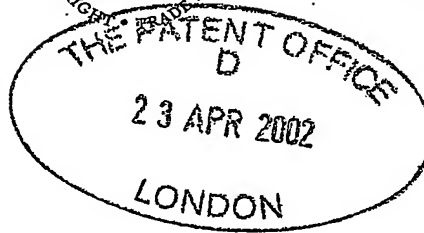


R02 E71/24-1 D00022
P01/7700 0.03-0209252.6

1/77

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NIS/SK/37289

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23 APR 2002

0209252.6

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Molins PLC
11 Tanners Drive
Blakelands
Milton Keynes
Bucks MK14 5LU

00611574005

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

GB

4. Title of the invention

Infusion Package and its Manufacture

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

fJ Cleveland
40-43 Chancery Lane
London WC2A 1JQ

Patents ADP number (if you know it)

07368855001

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Country

Priority application number
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Date of filing
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Number of earlier application

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1

Request for substantive examination (*Patents Form 10/77*)

Any other documents
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11. I/We request the grant of a patent on the basis of this application.

fJ Cleveland
Signature

Date

23 April 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

N I Smith 020 7405 5875

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DUPLICATE

1

Infusion Package

This invention relates to infusion packages and particularly, but not exclusively to infusion packages for coffee, and also to their formation.

5 Conventional infusion packages for tea or coffee comprise a porous walled container into which has been charged the coffee or tea. In use such containers are immersed in hot liquid such as water. It is known to suspend an open container such as a bag in the liquid and this has been achieved using a hanging string. In other arrangements a filter bag is provided with holding
10 members which enable the filter to be support from the rim of a container for the hot liquid. One such arrangement is described in E-A-0463181, but this arrangement can be difficult to use and manufacture. An infusion package which is simpler to manufacture is described in WO 01/51383, but it has been found particularly with coffee that such an arrangement does not produce a
15 satisfactory flavour in an acceptable time.

 According to one aspect of the present invention there is provided an infusion package comprising a semi-porous open container for an infusible material and a support for supporting the container from the rim of a vessel, said support being capable of defining an opening through which liquid can be
20 poured into the container, said container comprising opposite side walls and divider means which divides the container into two compartments such that

infusible material in one compartment is separated from that in the other compartment by said divider means.

The divider means may comprise a gusset formed between the side walls. The gusset may be formed integrally with the side walls.

5 The support may comprise a pair of juxtaposed members which are sealed at opposite ends. The sealing of the two members may be by means of a heat seal.

The upper end portion of the container may be sandwiched between the juxtaposed members of the support and sealed thereto by a heat seal. The support means may be foldable so that it can lie alongside the container to act as a closure which closes the open container until it is ready for use.

According to another aspect of the present invention there is provided an apparatus for forming an infusion package from a web of material comprising folding means for folding the web of material into substantially a W-shape, means for sealing the material at positions corresponding to edges of the package, one limb of the W-shape defining a first compartment and the other limb defining a second compartment, means for cutting the material to form from the web individual container parts, means for securing a support member to the upper open end portion of each container part to form the infusion package, filling means for filling each infusion package, and means for maintaining a separation between two compartments of the container part at

the filling means.

The apparatus may include second folding means for folding each support member to a position in which it closes the infusion package.

5 The apparatus may include a reel on which the web of material is wound. The apparatus may include means for feeding the material from the reel to the folding means. The feeding means may include tension and/or tracking control means for controlling the tension in the web of material.

10 The folding means may comprise means for forming the web of material into substantially a U-shape and means for forming a gusset into the base of the U-shape in order to create the W-shape.

The sealing means may comprise heat sealing means. The heat sealing means may include electrically heated jaws which engage opposite sides of the folded web. The jaws may be pneumatically operated. Alternatively the seal may be formed by crimping.

15 The cutting means may be designed to form a generally vertical cut along the sealed portions of the folded web.

The apparatus may include a source of pre-formed support members disposed downstream of the cutting means. Alternatively the support members may be formed from a web of material which is fed from a reel.

20 The apparatus may include a walking beam assembly for advancing the container parts and their accompanying support member through a support

member sealing section. The support member sealing section may comprise one or more sealing stations for heat sealing each support member to the upper open end of its associated container part.

5 The filling means may include a hopper disposed above the path of each formed infusion package, said hopper containing material to be delivered to each container part of each infusion package. The hopper may contain coffee.

The mouth of the hopper may include an auger for delivering a predetermined quantity of material to each package.

10 The separation maintaining means may comprise an elongate beam which is straddled by said compartments. The beam may extend from a position close to said cutting means along the path of the container parts to said filling means in order to maintain separated the two compartments defined by the W-shape of each container part. Alternatively the separation maintaining means may comprise a finger locatable between said two compartments at the
15 filling means. The finger may be disposed beneath the filling means and be movable upwardly to locate between said compartments. The finger can pneumatically or cam actuated.

The apparatus may include a sachet forming portion disposed
20 downstream of the support member folding section.

The invention will be described now by way of example only with

particular reference to the accompanying drawings. In the drawings:

Figure 1 is a perspective view of an infusion package for coffee according to one embodiment of the present invention;

Figure 2 is a cross-sectional view of the infusion package;

5 Figure 3 is a schematic plan view of the infusion package in use;

Figure 4 is a perspective view illustrating how the container is divided into two compartments;

Figure 5 is a side elevational view of an apparatus for forming a package of the type shown in Figures 1 to 4;

10 Figure 6 is a simplified schematic view illustrating the operations carried out by the apparatus of Figure 5;

Figure 7 is a simplified perspective view illustrating the operations of the apparatus of Figure 5; and

15 Figure 8 is another simplified perspective view illustrating one embodiment of a compartment separation maintaining means.

Referring to the drawings an infusion package (10) comprises a container (12) and a support (14) for the container. The support comprises two support members (14) by means of which the container can be mounted on a ring of a drinking vessel such as a mug or cup (15) as shown in Figure 3 of
20 the drawings.

The support elements can each comprise of a strip of plastics coated

board which are disposed opposite one another. Each support member is notched at one of its ends (16) to define a projection (18). The projection (18) lies in the plane of the support member and projects in the lengthwise direction of the member perpendicular to the ends (16).

5 At the end of the support members opposite the ends (16) there is a recess (22). The recesses (22) are aligned with and correspond in shape to the
..... respective projections (18).

 The support members are sealed to one another and to the container (12). These seals can be heat seals. The arrangement of the support members
10 is such that the end (16) of one member is disposed opposite the end (20) of the other member so that the respective projections project in opposite directions. Each support member has a series of score lines (24) disposed between the ends (16) and extending perpendicular to the lengthwise direction of the member and parallel to the end (16, 20). The score lines enable the
15 support members to be moved from a closed position (Figure 2) to an open position as shown in Figure 3 of the drawings.

 The container is in the form of an open ended sack or bag (12). The bag is formed from a web of porous heat sealable material which is folded to produce a cross section which is generally W-shaped as shown in Figures 2
20 and 4, the central part of the W forming a deep gusset. The long sides (30) of the W are sealed to each other by edge seals (32) which extend from the upper

to the lower end of the bag. The lower corners are rounded as shown at (35) in order to minimise drippage of liquid from the bag.

It will be seen from Figure 2 of the drawings that the central gusset (34) forms a divider means which divides the bag or container into two compartments (36, 38). Coffee in each of these compartments is separated by the central gusset. It has been found that this type of arrangement creates a coffee drink of enhanced flavour in an acceptable time. It will be appreciated that a minimum infusion time is achieved when each compartment has substantially equal amounts of coffee therein.

The upper open end of the bag (12) is sandwiched between the support members (14). The external surfaces of the bag at the open end are secured to the opposed inwardly facing surface of the support members in such a manner that the bag can be left open at the upper end as shown in Figure 3. The support members are sealed to one another at their ends (16, 20) by heat seals which extend parallel to the score lines (24).

It will be appreciated that the support member (14) can be folded over so that it is disposed alongside the upper end of the bag (12). This has the advantage that the size of any sachet containing the infusion package is reduced and the open end of the bag is effectively closed so that the coffee will not spill out in transit.

In use the bag is removed from a sachet in which it has been stored and

the support members are folded upwardly to bring the infusion package into the condition shown in Figure 1. A compressive force is applied to the opposite ends of the support member causing the members to bow outwardly in the region of the score lines (24). As shown in Figure 3 the result is that the support members adopt a generally oval configuration allowing the projections (18) to sit on the rim of a drinking vessel (15). In addition the bowing of the support members opens the upper end of the bag and provides an opening through which water can be poured onto the coffee contained in the two compartments (36, 38) of the bag.

10 It will also be appreciated that the design allows the bag to be supported from the rim of the vessel so that the coffee containing portion sits in the liquid in the vessel once the water has been poured into the bag.

The support members (14) can be formed by the method described in WO 01/51383, but their formation is not in any way restricted to this method.

15 Apparatus for forming an infusion package of the type described with reference to Figures 1 to 4 comprises a housing 90. In the housing 90 there is a reel 100 on which is wound a web of material for forming the container part 12 of the infusion package. This material may comprise any suitable porous heat sealable material used for forming infusion packets. The reel is carried on
20 a cantilevered shaft 102 mounted on the housing 90. The web of material is fed from the reel 100 along a path 101, which can include a pivoted guide

roller assembly, and a spring loaded dancing arm 103 to a forming section 108. The guide roller assembly allows fine adjustment of the web during operation. The dancing arm 103 controls web tension and can govern material unwind through a pneumatic brake.

5 The forming section 108 includes a fixed plate type flow former 104 which converts the flat web into a U-shape. A fixed blade 106 then creates in the U-shape the gusset 34 which has been described above with reference to Figure 2 of the drawings. The arrangement is such that one downwardly depending portion of the W-shape, which defines one compartment of the
10 container part, lies on one side of the blade and the other compartment lies on the other side of the blade. Guide bars are used to control the vertical alignment of the web.

 The folded material is then fed into a sealing section 110. In this section two sealing operations are carried out by means of electrically heated
15 movable jaws which are positioned on opposite sides of the folded web of material. A heated fixed plate 112 is located centrally in the sealing section and the limbs of the W-shape locate so that they straddle the plate 112. At a first sealing position the sealing jaws create a seal profile of the form shown at 114 in Figure 6 and at a second sealing position another set of sealing jaws
20 create the profile 115. Each movable jaw operates such that it nips the web between it and the fixed plate 112 in order to form the seal profile 114 in each

limb of the W-shape. A similar operation creates the seal profile 115. The seals are carried out in such a way as to retain the position of the gusset formed in the forming section.

The sealing jaws can be operated pneumatically or by way of cams to provide the necessary sealing force. After the sealing section the web is fed into a cutting section 118 which is designed to form a cut along the line 120 through each previously formed sealed portion so that the seal formed in the sealing section forms the trailing edge of one container part and the leading edge of the next container part. At this stage the long edges of each compartment defined by the W-shape are not sealed to each other so that the bay part defined by the seals has a saddle like configuration.

The cutting section is shown at 118 in Figure 5 of the drawings. The cutting section operates to cut a single container part from the leading edge of the web, that cut line being central to the vertical seal as just explained. The profile of the cut effected by the cutting section is shown at 120 in Figure 6 of the drawings.

The cutting section 118 includes an anvil and knife which are loaded together pneumatically, or via cams, in order to provide the necessary cutting force. The leading container part (122) is separated from the web in a subsequent operation by advancing that container part a greater distance than the web.

Immediately before the cutting station and disposed below the path of the container parts there is provided a mechanism (124) (Figure 8) for moving apart the two compartments of each container part. This mechanism comprises a pair of juxtaposed plates 125 which can be moved upwardly to locate in the gusset between the two compartments of each container part. The plates are expandable laterally to move apart those compartments to ensure that as the container part is advanced the container parts locate one on each side of and straddle the forward part 126 of an elongate beam 127.

Up until this point in the machine the web of material has been advanced along its linear path by means of a web advance gripper which draws the material off the reel up until its position in the cutting station. The web is arranged to be advanced 90mm during each machine cycle. The web advance gripper includes a pneumatically or cam actuated clamp mounted on a linear slide which grips the web. The clamp and slide are driven by a cam actuated lever 125. After each advance stroke the clamp is designed to release the web and the gripper and slider are returned to their start position. Whilst the web is not being indexed forward the web is held in position by a clamp.

The next process carried out by the apparatus is to apply support elements or tags 14 to the just formed container part. The machine includes a magazine 130 in which are loaded a plurality of pre-cut blanks each of which is to form a support element. This magazine typically has a capacity for 600

blanks. As can be seen the magazine is disposed vertically and the lowest blank is supported by a lip at the bottom and the magazine. Suction cups operate to draw the lowest blank vertically from the stack so that the lip then supports the next blank in the stack. These suction cups are actuated pneumatically and position a blank just above the top of a container portion. Each blank is located by means of side guides and supported on its base. The blank is then released above the container part and driven forward with the container part by drive pins on a walking beam assembly shown generally at 132. The blanks are folded from their flat condition into a V-shape by means of a folding shoe. An initial fold is made over a central support to an included angle of approximately 50°. The shoe holds the fold in this position until at a support element sealing section yet to be described completes the folding operation. The folding shoe is driven pneumatically or via cams.

Each container part and its associated, partly folded, tag or support element 14 is then moved through a sealing section 135 which comprises a series of four sealing stations by means of a walking beam assembly. In the arrangement shown in the drawings each container part and its associated tag undergo four sealing operations. These sealing operations are designed to seal the tag to the upper open end of the container part. To this end the sealing section 135 includes four sets of electrically heated jaws spaced longitudinally therealong on both sides of the tag. The sealing jaws are actuated

pneumatically or via cams to provide the necessary sealing force. The walking beam assembly is designed to advance the container parts and tags from the bag cutting section to a filling station and during each machine cycle the containers parts with their tags are advanced approximately 130 millimetres.

- 5 Beams provide a system for gripping and releasing the bags. A cam driven lever provides the forward and return motion to the beam.

The sealing positions are shown in Figure 6 and 7 of the drawings at 140, 141, 142 and 143. In the sealing stations 140, 141 and 142 the compartments of each container part are held apart by a relatively deep part 128 of the beam 127. In the sealing station 143 the beam 127 has a relatively
10 shallow part 129. This is to enable the upright edges of each compartment to be sealed together except at the part where the beam part 129 passes therethrough. After being sealed at position 143 the tag is securely sealed to its container part to form an infusion package.

- 15 Downstream of the tag sealing section is a filling section 145. The filling section includes a hopper 146 disposed above the path of the infusion packages. The mouth of the hopper includes a servo driven auger which is arranged to deliver an accurate amount of coffee which is stored in the hopper 146 to each infusion package as it passes below the mouth of the hopper. At
20 the filling station each package is opened by means of pneumatically or cam actuated suction cups in order to allow coffee to enter through the mouth of the

package. The two compartments defined by the W section of the container part 12 are still disposed on opposite sides of the beam part 129 at this stage and hence coffee delivered from the hopper 146 enters both of these compartments substantially in equal quantities. The compartment separating means which in this embodiment is the beam part 129 plays an important function in ensuring that the two compartments receive equal quantities of coffee.

Sensors can be provided to check that each infusion package is correctly positioned and open and the compartments of the container part can be opened by means of an air blast prior to the coffee being dispensed therein. The apparatus can include a vibrator for vibrating the package in order to prevent coffee bridging in the container part.

After filling each infusion package is closed and the bag is transferred from the filling station on the walking beam assembly to a reject station 160. The reject station 160 is designed to provide for automatic rejection of the packages if they do not meet certain criteria.

The next stage in the apparatus is a tag or support element folding section shown at 170. In this section as shown in Figure 6 of the drawings each tag or support element is folded over so that it lies alongside its associated container part the fold line occurring in the container part material. This act of folding the tag over securely closes the infusion package and maintains the coffee in the container part during transit. A plough can be used to fold the

tag towards the inside of the apparatus and guides support the tag and container part as it is transferred to the next section.

The final section of the apparatus is a sachet forming section 180 which is designed to enclose each filled infusion package in a sealed sachet. The apparatus includes a reel 200 on which a web of material for forming the sachet is wound. Material is feed from the reel 200 along a path 201 past a spring loaded dancing arm 202 to the sachet forming section 180. A sachet advance gripper draws material from the reel 200 up to a sachet seal and cut module 204 which carries out the operation shown at 205 and 206 in Figure 6. The material is sealed vertically and then the sachets are then cut by forming a cut in the leading edge of the web that cut line being central to the formed vertical sachet seal.

As described the support elements or tags 14 are formed from pre-cut blanks stored in a magazine 130. It is possible to also form the tags from a continuous web of material fed from a reel such as that shown at 210.

Also as described the compartment separating means at the filling station comprises a beam part 129. Alternative arrangements are possible. For example a finger could be provided below the filling station 145, the finger being actuatable to locate between the two compartments of each container part to hold apart those compartments. The finger can be movable upwardly to its operative position by pneumatic or cam actuating means.

Claims

1. An infusion package comprising a semi-porous open container for an infusible material and a support for supporting the container from the rim of a vessel, said support being capable of defining an opening through which liquid
5 can be poured into the container, said container comprising opposite side walls and divider means which divides the container into two compartments such that infusible material in one compartment is separated from that in the other compartment by said divider means.

10

2. An infusion package according to claim 1, wherein the divider means comprises a gusset formed between the side walls.

15

3. An infusion package according to claim 2, wherein the gusset is formed integrally with the side walls.

4. An infusion package according to any preceding claim, wherein the support comprises a pair of juxtaposed members which are sealed an opposite ends.

20

5. An infusion package according to claim 4, wherein the sealing of the

two members is by means of a heat seal.

6. An infusion package according to claim 4 or claim 5, wherein the upper end portion of the container is sandwiched between the juxtaposed members of the support and sealed thereto by a heat seal.

7. An infusion package according to any preceding claim, wherein the support means is foldable so that it can lie alongside the container to act as a closure which closes the open container until it is ready for use.

10

8. An apparatus for forming an infusion package from a web of material comprising folding means for folding the web of material into substantially a W-shape, means for sealing the material at positions corresponding to edges of the package, one limb of the W-shape defining a first compartment and the other limb defining a second compartment, means for cutting the material to form from the web individual container parts, means for securing a support member to the upper open end portion of each container part to form the infusion package, filling means for filling each infusion package, and means for maintaining a separation between the two compartments of the container part at the filling means.

20

9. Apparatus according to claim 8 including second folding means for folding each support member to a position in which it closes the infusion package.

5 10. Apparatus according to claim 8 or claim 9 including a reel on which the web of material is wound.

11. Apparatus according to claim 10 including means for feeding the material from the reel to the folding means.

10

12. Apparatus according to claim 11 wherein the feeding means includes tension and/or tracking control means for controlling the tension in the web of material.

15 13. Apparatus according to any one of claims 8 to 12 wherein the folding means comprise means for forming the web of material into substantially a U-shape and means for forming a gusset into the base of the U-shape in order to create the W-shape.

20 14. Apparatus according to any one of claims 8 to 13 wherein the sealing means comprise heat sealing means.

15. Apparatus according to claim 14 wherein the heat sealing means include electrically heated jaws which engage opposite sides of the folded web.

16. Apparatus according to claim 15 wherein the jaws are pneumatically or
5 cam operated.

-----17.-----Apparatus according to any one of claims 8 to 13 wherein the sealing means comprise crimping means.

10 18. Apparatus according to any one of claims 8 to 17 wherein the cutting means are designed to form a generally vertical cut along the sealed portions of the folded web.

19. Apparatus according to any one of claims 8 to 18 including a source of
15 pre-formed support members disposed downstream of the cutting means.

20. Apparatus according to any one of claims 8 to 18 in which the support members are formed from a web of material which is fed from a reel.

20 21. Apparatus according to any one of claims 8 to 20 including a walking beam assembly for advancing the container parts and their accompanying

support member through a support member sealing section.

22. Apparatus according to claim 21 wherein the support member sealing section comprises one or more sealing stations for heat sealing each support member to the upper open end of its associated container part.

23. Apparatus according to any one of claim 8 to 22 wherein the filling means includes a hopper disposed above the path of each formed infusion package, said hopper containing material to be delivered to each container part of each infusion package.

24. Apparatus according to claim 23 wherein the hopper contains coffee.

25. Apparatus according to claim 23 or claim 24 wherein the mouth of the hopper includes an auger for delivering a predetermined quantity of material to each package.

26. Apparatus according to any one of claim 8 to 25 wherein separation maintaining means comprise an elongate beam which is straddled by said compartments.

27. Apparatus according to claim 26 wherein the beam extends from a position close to said cutting means along the path of the container parts to said filling means in order to maintain separated the two compartments defined by the W-shape of each container part.

5

28. Apparatus according to any one of claims 8 to 25 wherein the separation maintaining means comprise a finger locatable between said two compartments at the filling means.

10 29. Apparatus according claim 28 wherein the finger is disposed beneath the filling means and is movable upwardly to locate between said compartments.

15 30. Apparatus according to claim 29 wherein the finger is pneumatically or cam actuated.

31. Apparatus according to any one of claims 8 to 30 including a sachet forming portion disposed downstream of the support member folding section.

20 32. A method of forming an infusion package from a web of material comprising folding the web of material into substantially a W-shape, sealing

the folded web at positions corresponding to edge portions of a container part of the package, cutting the web along the sealed portions to form individual container parts, attaching a support to each container portion, and filling the two compartments defined by the W-shape of each container part whilst
5 holding apart said compartments to ensure equal distribution of the filled material into each compartment.

33. An infusion package substantially as hereinbefore described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

10

34. Apparatus for forming an infusion package substantially as hereinbefore described with reference to and as shown in Figures 5 to 8 of the accompanying drawings.

15 35. A method forming an infusion package substantially as hereinbefore described.

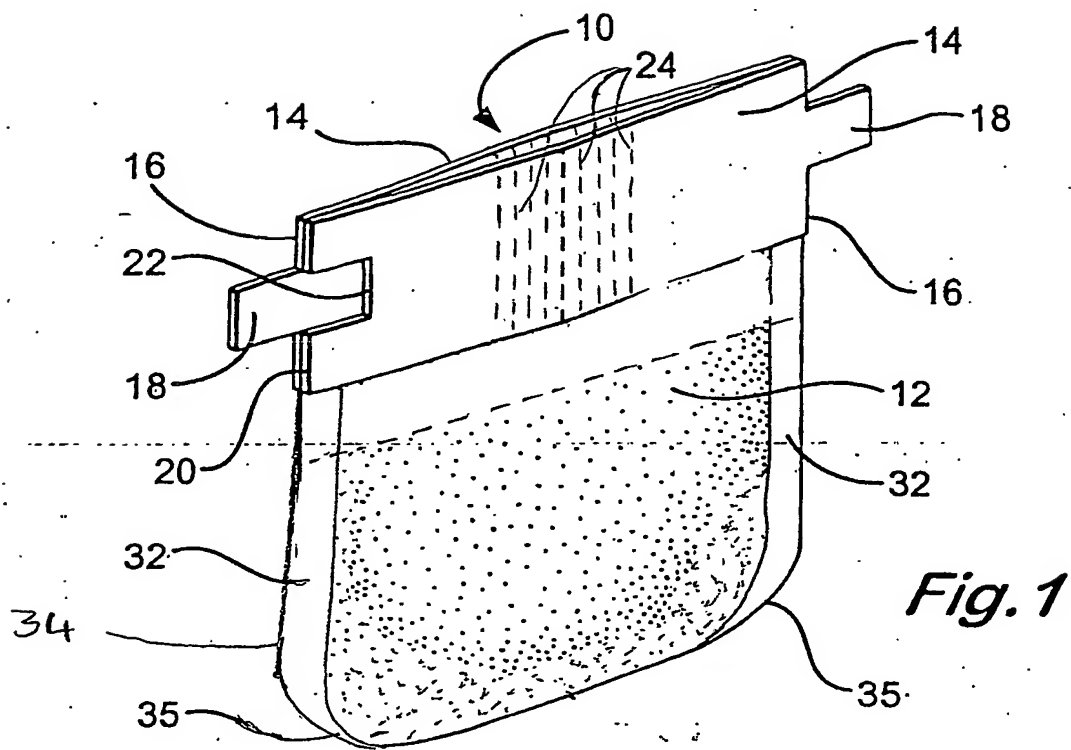


Fig. 1

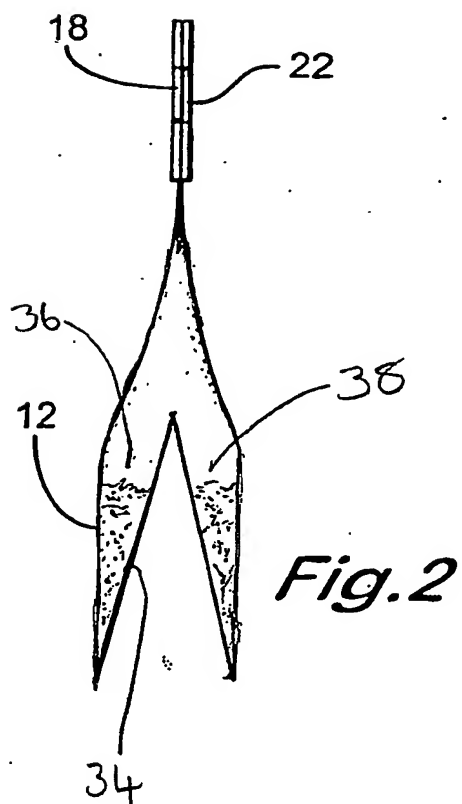


Fig. 2

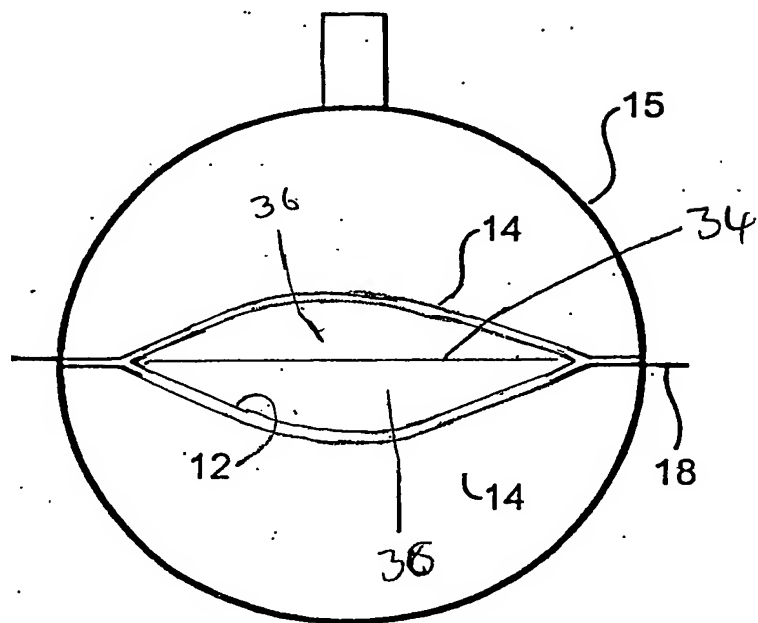


Fig. 3

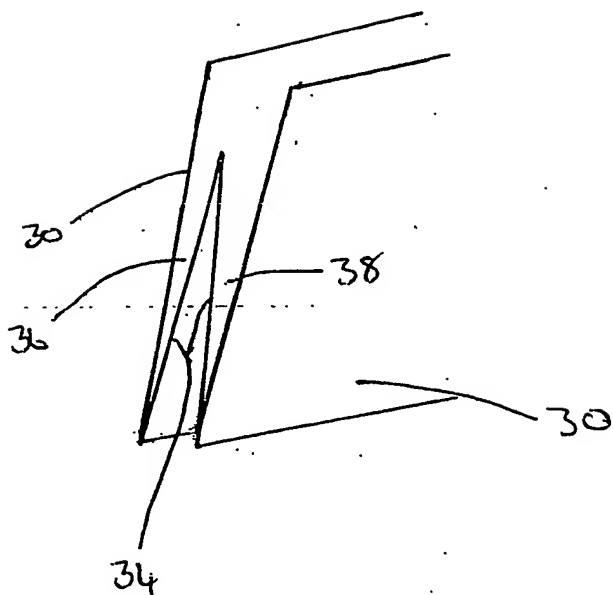


FIG 4

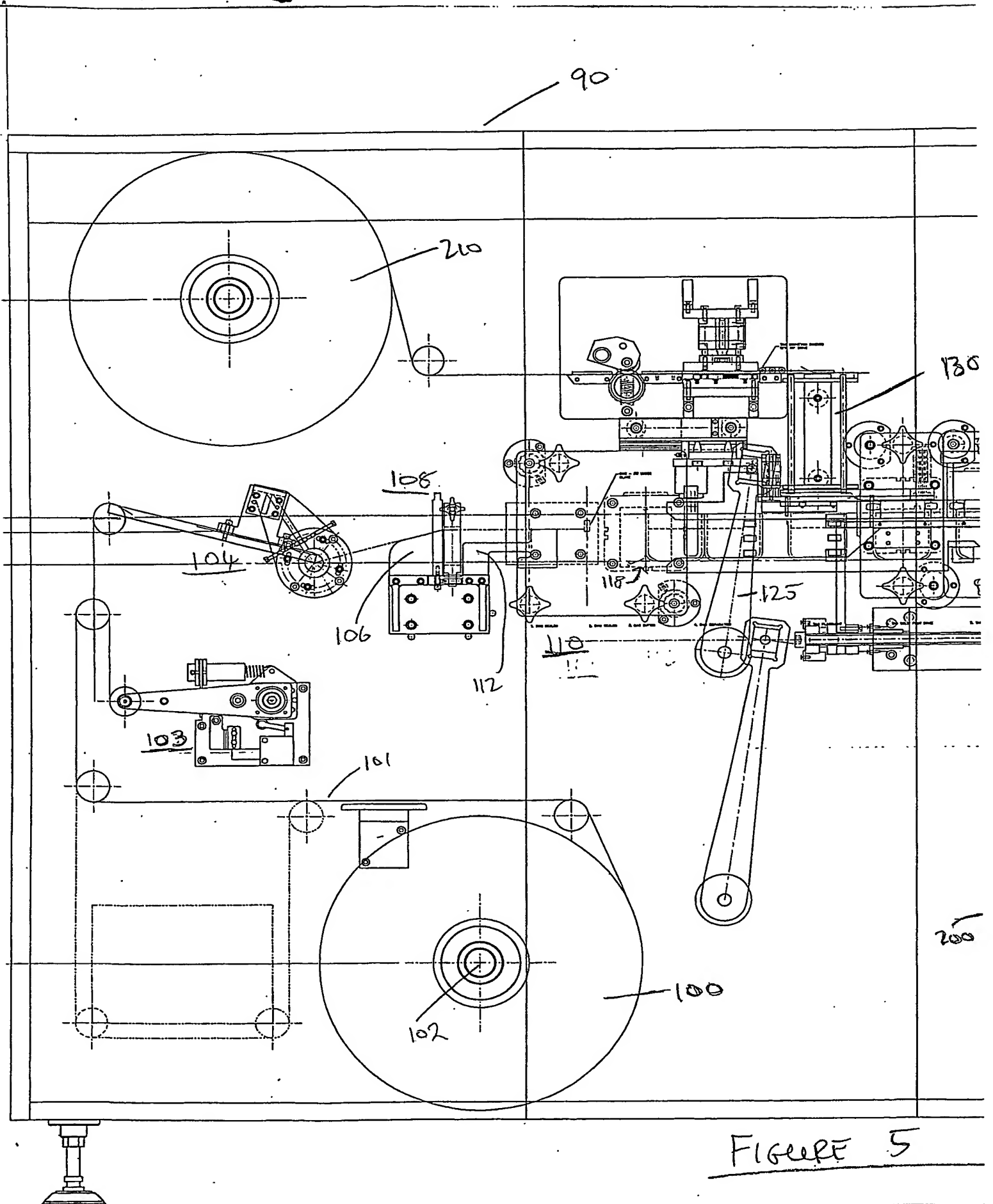
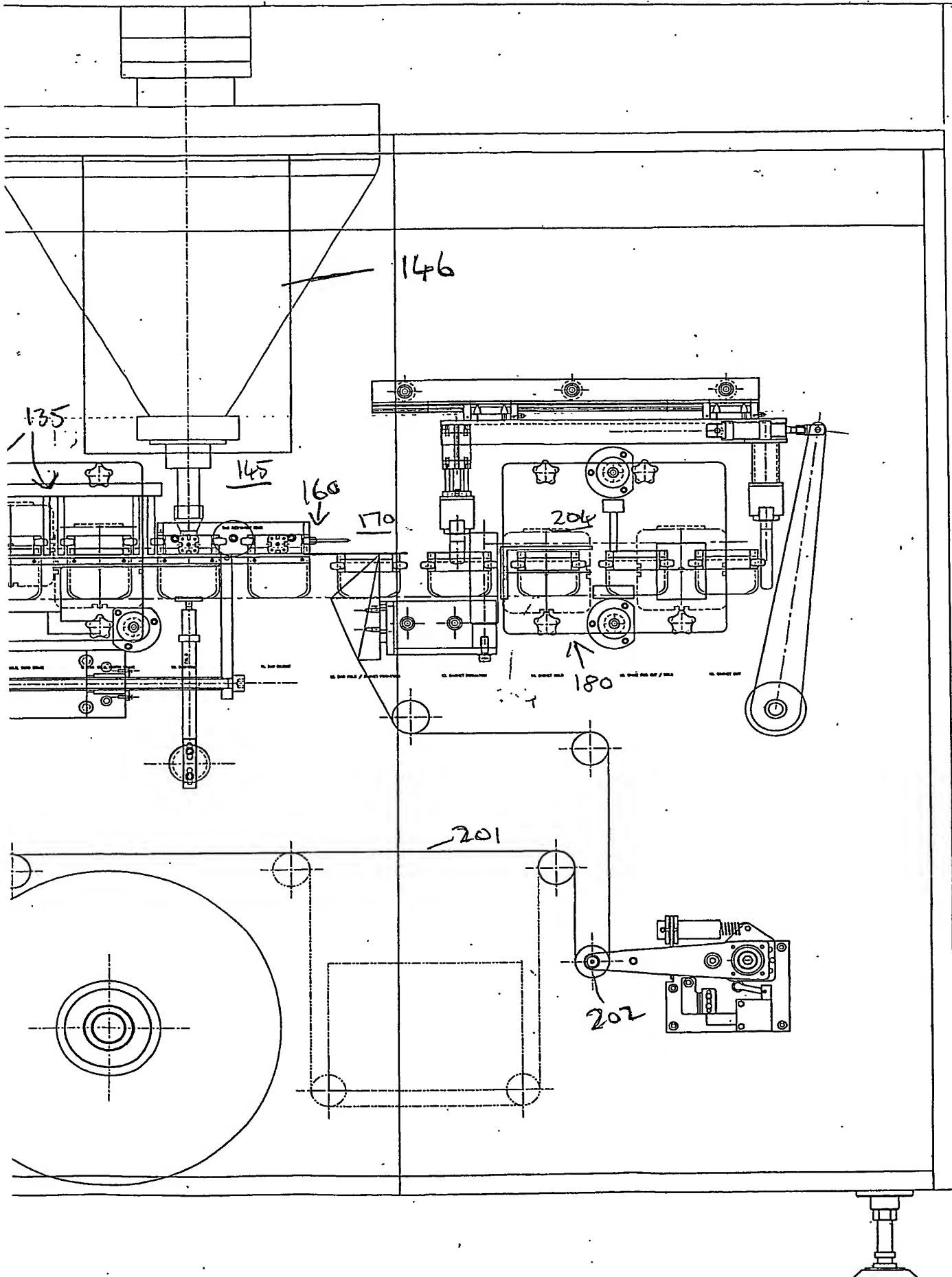


FIGURE 5



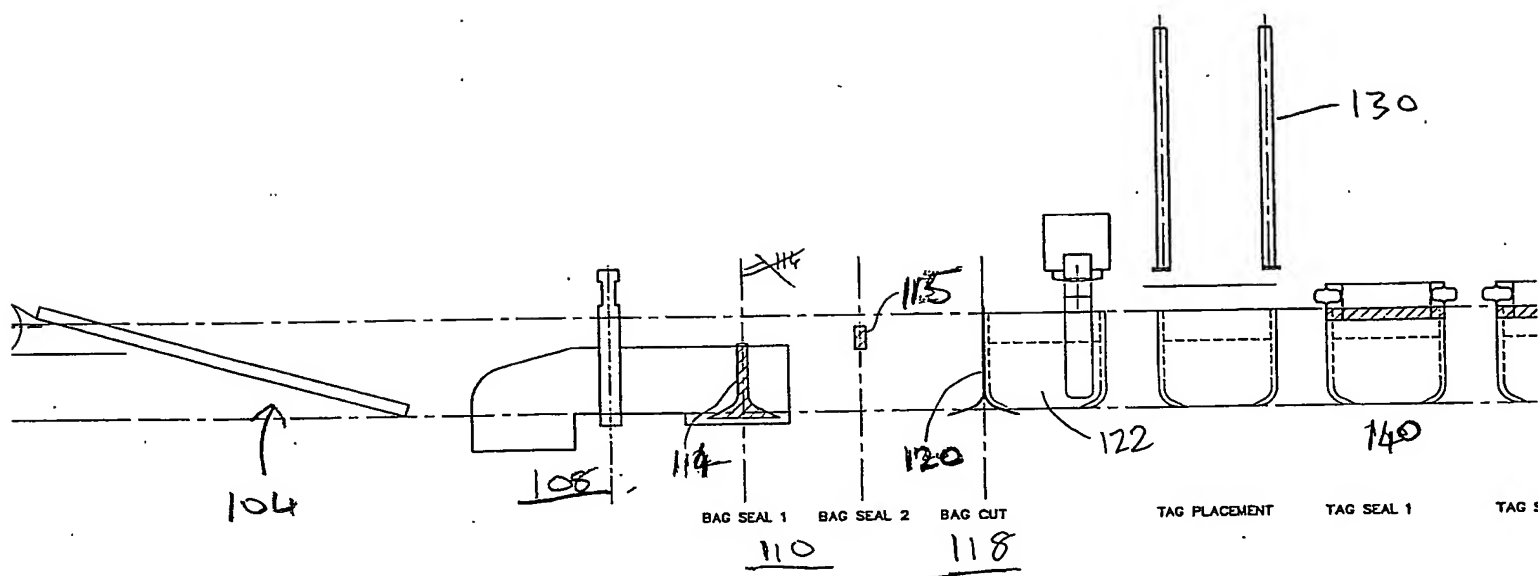
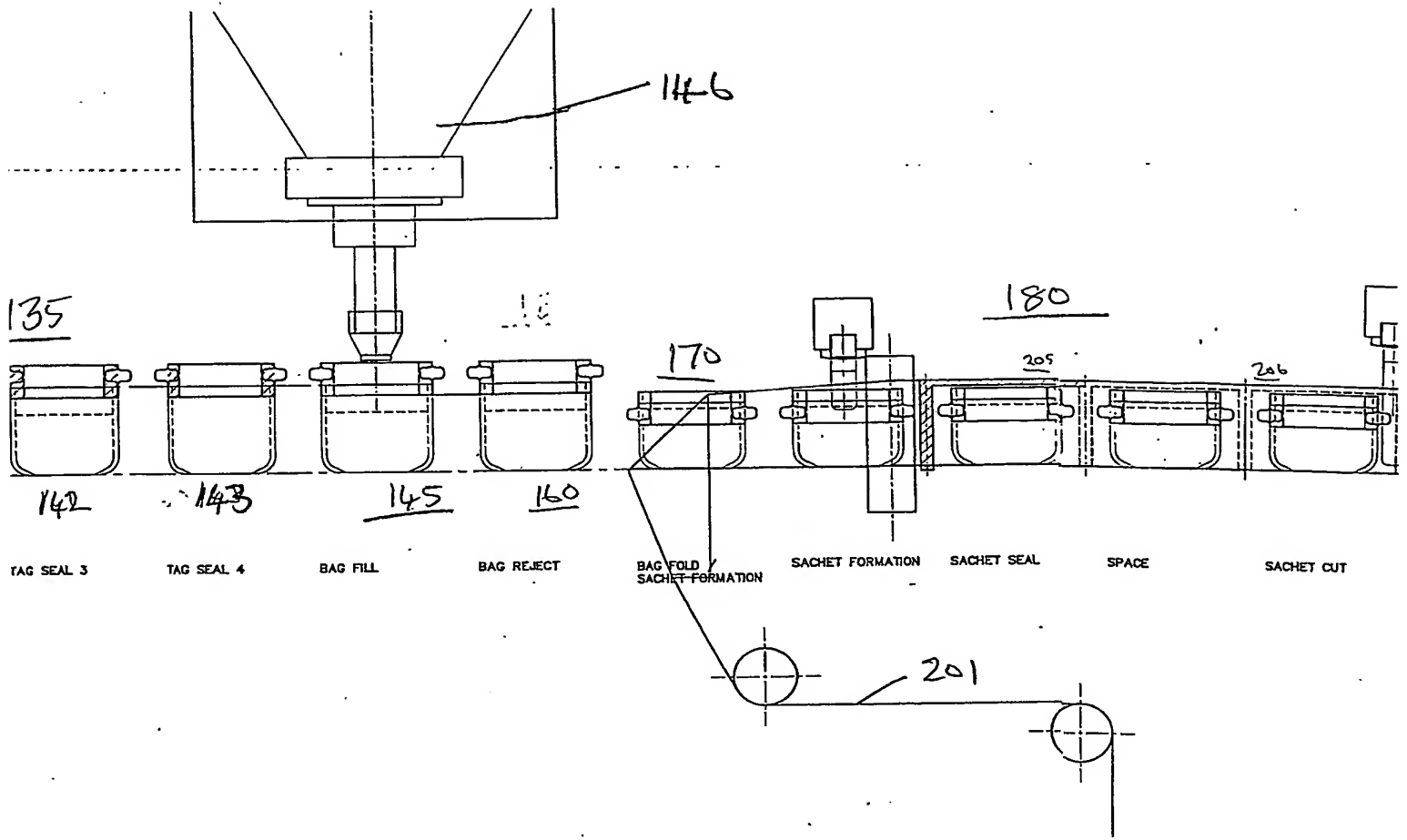


FIGURE 6



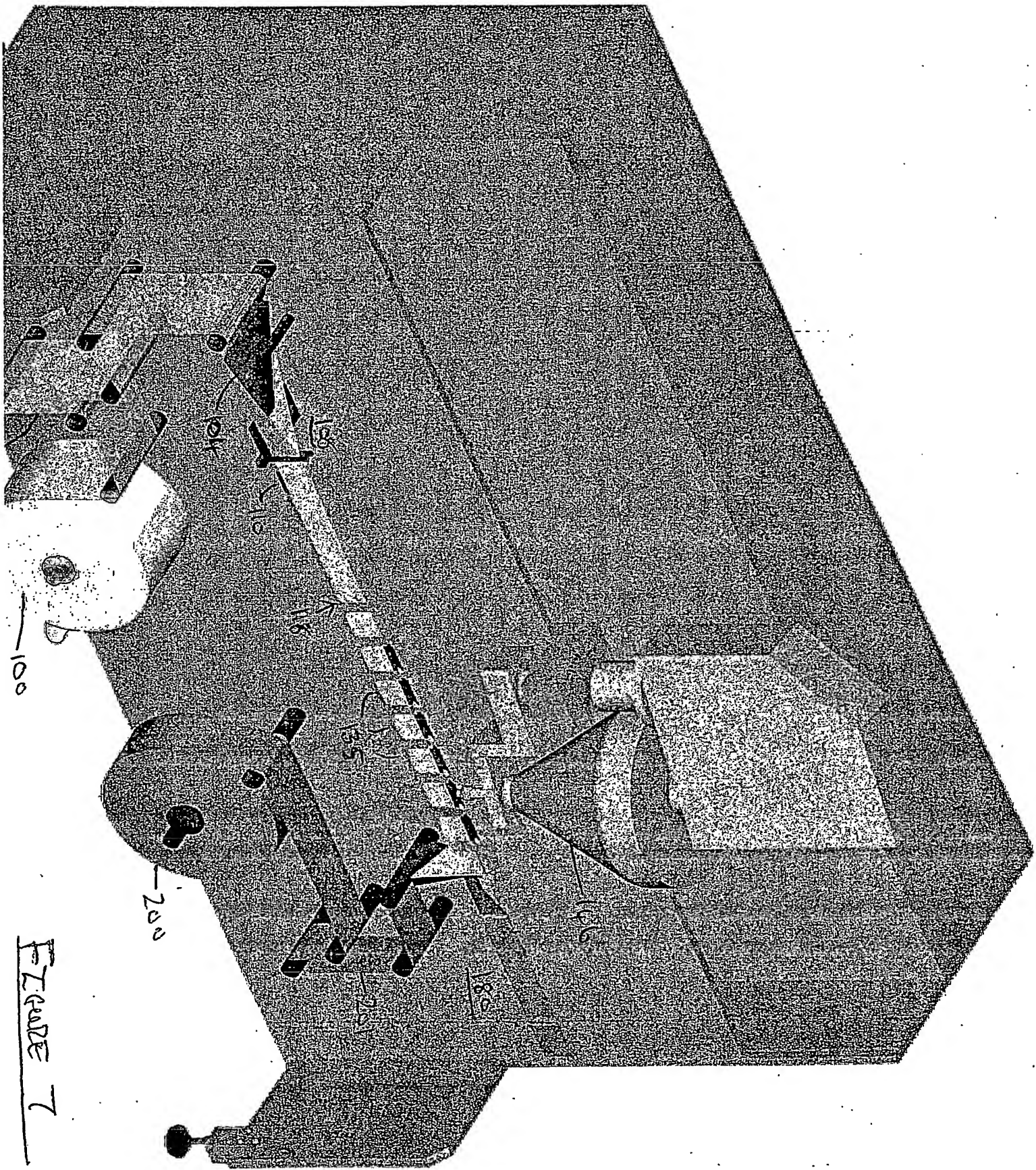


FIGURE 7

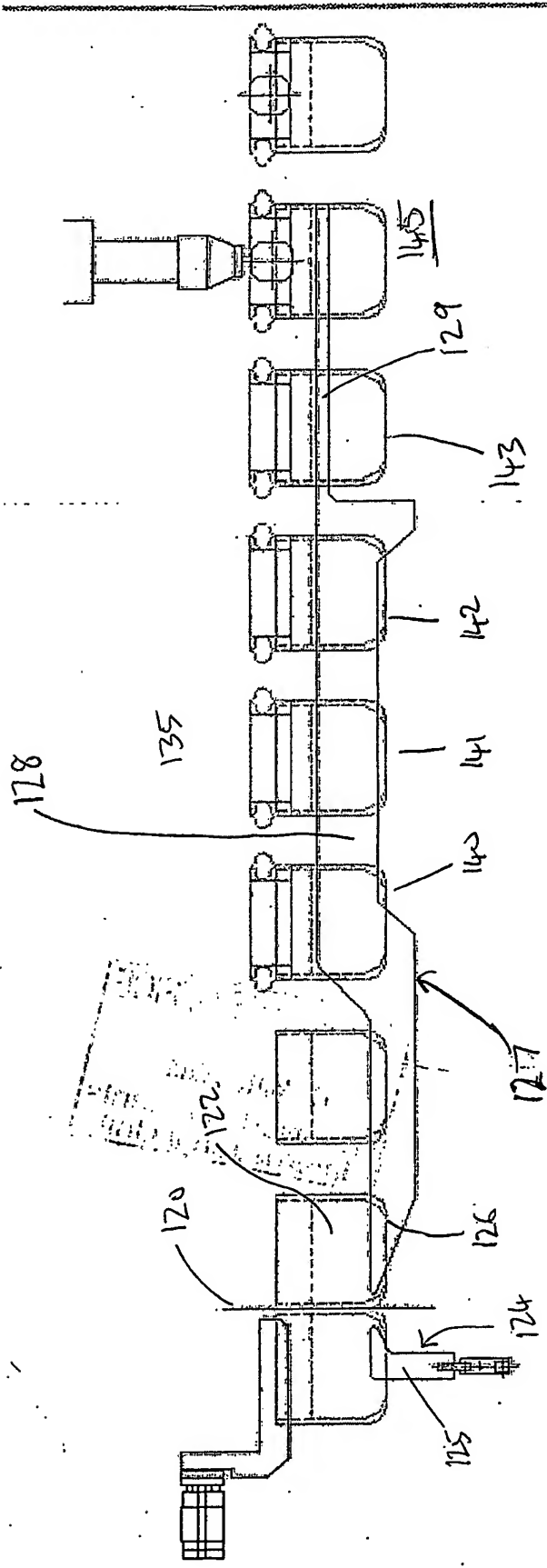


FIG. 8

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